

Claims

1. Fluid construction mixture comprising a (i) sludge or tailing material (such as a dredged material), (ii) a binder, (iii) a binder retarding agent, optionally (iv) a foaming agent and optionally (v) a weighting material.
2. Construction mixture according to claim 1, comprising a fibrous material.
3. Construction mixture according to claim 2, comprising at least one fibrous material selected from the group consisting of metal fibres, polymeric fibres, glass fibres and organic fibres, preferably selected from the group consisting of organic fibres, more preferably selected from wood fibres, wool, reed, straw, dried grass (hay) and flax.
4. Construction mixture according to any one of the preceding claims, wherein water is present providing a water to binder weight ratio of more than 1, preferably in the range of 1.5 to 10, more preferably in the range of 2 to 9.
5. Construction mixture according to any one of the preceding claims, wherein the amount of binder in the mixture, is in the range of about 50 to about 400 kg/m³ sludge, preferably about 75 to about 200 kg/m³ sludge
6. Construction mixture according to any one of the preceding claims, wherein the binder is selected from the group consisting of fly ashes, cements and lime-based binders (such as calcium oxide, magnesium oxide silica, ferric oxide, aluminium oxide), preferably from the group consisting of fly ashes.
7. Construction mixture according to any one of the preceding claims, wherein the amount of sludge in the construction mixture is at least about 50 % (by volume), preferably 50-98 % (by volume), more preferably about 65-95 % (by volume).
8. Construction mixture according to any one of the preceding claims, wherein the binder retarding agent is present in an effective amount to keep the mixture pumpable for at least 1 day from its preparation, under ambient conditions.

9. Construction mixture according to any one of the preceding claims, wherein the binder retarding agent is selected from the group consisting of polyphosphates, sulphonated naphthalenes and lignosulphonates.

10. Construction mixture according to any one of the preceding claims,
5 wherein the foaming agent is present in an effective amount to cause foaming of the mixture, preferably in an amount of between 0.5 and about 5 kg/m³.sludge .

11. Construction mixture according to any one of the preceding claims, wherein the foaming agent is selected from the group consisting of
10 alkylsulphonates and nitrogen containing surfactants, preferably a foaming agent selected from sulfohydroxypoly(oxy-1,2-ethandiyl)-C10-C16-alkylether (e.g. sodium salt), cocosalkyldimethylaminoxide and sodiumolefin(C14/C16)sulfonate.

12. Construction mixture according to any one of the preceding claims,
15 wherein the weighting materials, is selected from the group consisting of minerals with specific weight that is higher than the average specific weight of the mixture, and preferably from the group consisting of baryte, hematite and magnetite.

13. Method for preparing a fluid construction mixture according to any
20 one of the preceding claims comprising mixing a sludge or tailing material, a binder, a binder retarding agent, optionally a foaming agent and optionally a weighting material.

14. Method according to claim 13, wherein undesired macroscopic
objects (e.g. bricks, bikes and the like, household equipment, packaging
25 materials) are removed from the sludge or tailing material, prior to mixing.

15. Method according to claim 13 or 14, wherein organic pollutants – in particular oxidising pollutants - are removed from the sludge, the tailing material or the mixture, preferably by aerating.

16. Method for preparing a solid construction material, comprising solidifying a fluid construction mixture according to any of the preceding claims.

17. Method according to claim 16, comprising adding an binder initiator
5 to the fluid construction mixture, thereby causing the solidification of said mixture.

18. Method according to any one of the claims 16 or 17, wherein the binder initiator is added in an effective amount to cause solidifying within 10 seconds to 3 days after adding, under ambient conditions.

10 19. Method according to any one of the claims 16-18, wherein the binder initiator is added in an amount of about 25 to about 250 kg/m³ sludge.

20. Method according to any one of the claims 16-19, wherein the binder initiator is selected from the group consisting of water glass and alkaline hydroxides (such as sodium hydroxide, potassium hydroxide and sodium
15 aluminates).

21. Method according to any one of the claims 16-20, wherein after solidifying, the construction material is granulated.

22. Solid construction material (in particular in the form of a brick, a block or a granular material obtainable by a method according any one of the
20 claims 16 to 20).

23. Solid construction material, according to claim 20, having a closed and/or open pores with a porosity up to 75 %.

24. Solid material according to claim 20 or 21 having a water permeability range between 10⁻⁴ m/s and 10⁻¹¹ m/s (according Darcy),
25 preferably between 10⁻⁴ m/s and 10⁻⁷ m/s.

25. Use of a fluid construction mixture as defined in any one of the claims 1-15, or a solid construction material as defined in any one of the claims 16-24 in providing an infrastructural element.

26. Use according to claim 25, wherein the infrastructural element is
30 selected from the group consisting of roads, parkings, airplane-landing strips,

quays, seawalls, embankments, dikes, road embankments railway embankments, dams, sound barriers and land reclamation projects.

27. Infrastructural element comprising a pumpable construction mixture as defined in any one of the claims 1-12, or a solid construction
5 material as defined in any one of the claims 22-24.

28. Infrastructural element according to claim 27, comprising a water permeable upper layer (1) (such as an asphalt layer), a water permeable support layer (2), said support layer comprising the solid construction material according to any one of the claims 22-24, a drain (3) for allowing water
10 permeating from the upper layer (1) through the support layer (2) to be drained from said layers, wherein said drain (3) is in fluid communication with a provision (6, 7, 8) for removing a component from water that has permeated through said layers.

29. Use of a solid construction material as defined in any one of the
15 claims 22-24 as ballast, in particular as ballast for a ship, counterweights at cranes or ballast material for underwater pipelines or underwater constructions.